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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

EDWARDS, PATRICK L

ART UNIT	PAPER NUMBER
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2621

DATE MAILED: 05/20/2004

6

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/866,817

Applicant(s)

SILBER, ANDREW DAVID

Examiner

Patrick L Edwards

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 6, 7, 20 and 21 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

With regard to claims 6 and 7, the methods described in claims 6 and 7 are not described in the specification or shown in the drawings.

With regard to claim 20, there is no support in the specification or the drawings for a recording medium that stores a control program which is executable on a computing device.

With regard to claim 21, there is no support in the specification or the drawings for a carrier wave encoded to transmit a control program to a device for executing a control program.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 6 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regard to these claims, the metes and bounds of the term 'setback distance' are not clear as recited in the claim in that it isn't made clear whether this setback distance corresponds to a spatial distance in the image itself (i.e. a distance between pixels in the x - y coordinates of the image plane), or whether it is referring to a depth distance of the scene which is being imaged. This specification also fails to clearly explain this term. For examination purposes, the term 'setback distance' is interpreted herein to be a distance in the x-y coordinate system of the image itself.

Additionally, the processes described in claims 6 and 7 aren't clear as recited in the claim and are not clearly supported in the specification.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-5, 8-20 and 22-27 are rejected under 35 U.S.C. 102(e) as being anticipated by Olsson (USPN 6,445,415 B1).

With regard to claim 1, Olsson discloses a method for constructing a composite image of at least a portion of an object based on a plurality of source images which include at least that portion of the object (col. 3 lines 20-23), and in which the plurality of source images correspond to a different focal plane with respect to the object (col. 3 lines 32-33).

Olsson further discloses performing a first type of analysis of the source images, at a plurality of spatial locations in the source images, to determine a first set of pixels of the composite image corresponding to at least one of edges and boundaries in the composite image (col. 6 lines 6-8).

Olsson further discloses performing a second type of analysis of the source images, at a plurality of spatial locations in the source images, to determine a second set of pixels of the composite image corresponding to surfaces in the composite image (col. 6 lines 15-21).

With regard to claim 22, all of the limitations of the claim have been addressed and Olsson further discloses an imaging system (the camera at col. 10 lines 12-26), a vision system controller (this is implicit in the computer which performs various controlling functions described at col. 10 lines 37-44), a memory portion (implicit in the storing called for at col. 10 lines 28), and a composite image processor is implemented via the 'computer' and the 'programs' discussed at col. 10 lines 45-53, which includes "integration of focused image elements" (col. 10 lines 51-53).

With regard to claim 20, a computer-readable recording medium that stores a program which causes the computer to execute the steps of a method is essential if the image processing method disclosed in Olsson is to function. This is discussed at col. 10 lines 27-30, a control program ("software") in Olsson is executable on a "computer". Therefore a recording medium for storing the program is inherently required.

With regard to claims 2 and 3, Olsson further discloses that the first set of pixels of the composite image corresponds to adequately focused edges or boundaries and surface regions included in the plurality of source images (col. 5 lines 5 – 25). In the cited passage, Olsson discloses that the sharp elements are selected. The term 'elements' as disclosed in Olsson, refers to both edge areas and surface areas of the image (see col. 6 lines 1-21). The term 'sharp' as disclosed in Olsson is analogous to 'adequately focused' as recited in the claim.

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With regard to claim 4, Olsson further discloses that the first set of pixels of the composite image is determined before the second set of pixels of the composite image is determined; and the second set of pixels is determined such that the second set of pixels does not include any of the pixels of the composite image which have been determined to be in the first set of pixels (col. 6 lines 6-21). Since the surfaces disclosed in Olsson are limited by the edges, it follows that this second set does not include any of the pixels from the first set.

With regard to claim 5, Olsson further discloses that determining the second set of pixels of the composite image further comprises suppressing image artifacts which correspond to out-of-focus edges or boundaries included in the plurality of source images (col. 6 lines 50-54).

Olsson further discloses that the at least one characteristic associated with the at least one pixel in the second set of pixels of the composite image that lies at least the prescribed setback distance away from each of the pixel of the first set of pixels of the composite image comprises at least one of a source image, a source image index, and a source image focal plane (col. 9 lines 10-25).

With regard to claim 8, Olsson further discloses that the first type of analysis is based on either gray scale intensities or color image intensities at col. 6 lines 6-9 ("light strength or color").

With regard to claim 9, Olsson further discloses that the first type of analysis comprises a numerical characterization of the source images at some of the plurality of spatial locations (i.e. the "relative derivative" at col. 6 lines 6-12).

With regard to claim 10, Olsson further discloses that the numerical characterization is a gradient derivative analysis (col. 6 lines 6-12). The relative derivative disclosed in Olsson is analogous to a gradient derivative analysis as recited in the claim.

With regard to claim 11, Olsson discloses analyzing the results of the numerical characterization of the source images at the spatial locations to determine whether the results are satisfactory (Olsson col. 4 lines 43-45).

Olsson further discloses determining a respective satisfactory source image corresponding to the satisfactory result at each respective spatial location where the results are satisfactory (col. 4 lines 43-46). The selected focus image disclosed in Olsson is analogous to the satisfactory source image recited in the claim.

Olsson further discloses determining at least one pixel of the composite image at the respective spatial locations based at least partially on the respective satisfactory source image (col. 5 lines 21-25).

With regard to claim 12, Olsson further discloses making a pixel at the respective spatial location the same as the pixel from the satisfactory source image which is spatially congruent with the composite image (col. 5 lines 5-31).

With regard to claim 13, Olsson further discloses that numerical characterization results are satisfactory if they fall within a range of satisfactory values (col. 4 lines 43-46). The Olsson reference discloses making a comparison of the level of focus in order to determine if it is satisfactor. Although the Olsson reference does not explicitly state that this comparison is made by comparing the results to a prescribed range of satisfactory values, the Olsson reference does teach that this process is performed using a computer with a processor executing steps from a computer program. Performed on a computer, the comparison and subsequent determination if a level of focus is

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satisfactory taught in the Olsson reference, would be performed by comparing one value to another (see col. 4 lines 44-45 "the focus ... is compared between images"). Thus, the prescribed range as called for in claim 13 corresponds to the range of focus measurements that indicate focused image elements.

With regard to claim 14, Olsson further discloses that the second type of analysis comprises a numerical characterization of the source images at the spatial locations (col. 7 lines 52-60). The determination of a sharpness value as disclosed in Olsson qualifies as the claimed numerical characterization.

With regard to claim 15, Olsson further discloses that the numerical characterization comprises a texture classification analysis (col. 7 line 49 et seq "measuring the defocusing"). The Olsson reference teaches determining a value indicative of the level of unsharpness or defocus. This determination of unsharpness level disclosed in Olsson qualifies as the claimed texture analysis (per the applicant's specification (paragraphs [0011-0013])).

With regard to claim 16, Olsson discloses analyzing the results of the numerical characterization of the source images at the spatial locations to determine whether the results are satisfactory (Olsson col. 4 lines 43-45).

Olsson further discloses determining a respective satisfactory source image corresponding to the satisfactory result at each respective spatial location where the results are satisfactory (col. 4 lines 43-46). The selected focus image disclosed in Olsson is analogous to the satisfactory source image recited in the claim. Olsson further discloses determining at least one pixel of the composite image at the respective spatial locations based at least partially on the respective satisfactory source image (col. 5 lines 21-25).

With regard to claim 17, Olsson further discloses making a pixel at the respective spatial location the same as the pixel from the satisfactory source image which is spatially congruent with the composite image (col. 5 lines 5-31).

With regard to claim 18, see the above argument with respect to claim 13.

With regard to claim 19, Olsson further discloses determining a source image having a focal plane which is representative of the focal planes of a plurality of respective satisfactory source images corresponding to a plurality of respective spatial locations in a local region including the at least one pixel of the second set of pixels of the composite image, and determining the at least one pixel of the second set of pixels of the composite image based on the source image having the representative focal plane (col. 5 lines 5-31). Olsson teaches a "basic image" with a focal plane of the products front at col. 5 lines 5-12. This "basic image" is analogous to the source image having a representative focal plane as recited in the claim. Olsson further teaches determining a pixel from the second set of image pixels (the "surface of interest" in Olsson). This determination is based on the basic image (col. 5 lines 13-20).

With regard to claim 23, all of the limitations of the claim have been previously addressed in the above arguments with respect to claims 9 and 14.

With regard to claim 24, the additional limitation of the claim has been previously addressed in the above argument with respect claim 4.

With regard to claim 25, the additional limitation of the claim has been previously addressed in the above argument with respect to claim 5.

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With regard to claim 26, Olsson discloses a composite image processor which is part of a general computerized control system of the vision system (col. 10 lines 8-53).

With regard to claim 27, Olsson discloses a general computerized control system further comprising a control instruction generation system operable to generate at least one of a part program instruction, an inspection program control instruction, and a composite image processor control instruction, the generated instruction usable to operate the composite image processor to construct a desired representation of a composite image (col. 10 lines 8-53).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 6 and 7 rejected under 35 U.S.C. 103(a) as being unpatentable over Olsson as applied to claim 5 above, and further in view of Muir et al. (USPN 6,064,767).

With regard to claim 6, Olsson discloses suppressing out of focus edges and boundaries in the plurality of source images, but fails to expressly disclose doing so using the method described in claim 6. Muir, however, discloses determining a pixel in a second set of pixels which lies a prescribed setback distance from a first set of pixels (Muir col. 5 line 59 – col. 6 line 3). The black pixels disclosed in Muir are a second set of pixels and it follows that the white pixels are a first set. The central black “seed” pixel lies a prescribed distance away from any of the pixels from the first set of pixels (i.e. the white pixels).

Muir further discloses subsequently determining a pixel from the second set of pixels which lies a distance less than the prescribed setback distance away from the at least one pixel in the first set of pixels. Muir teaches growing a region of black pixels around the “seed” pixel until a number of white pixels is encountered (Muir col. 5 line 59 – col. 6 line 3). The grown black pixels now lie a distance less than the prescribed setback distance away from the at least one pixel in the first set of pixels. It would have been obvious to one reasonably skilled in the art at the time of the invention to use Muir’s image segmentation method to perform an edge focusing as taught by Olsson. Such a modification would have allowed for a clearer determination of region boundaries (Muir col. 6 lines 2-3), which would have resulted in a faster artifact (i.e. out of focus edges) suppressing method (Olsson col. 9 lines 16-19).

With regard to claim 7, it was stated above that the pixel from the second set of pixels which lies a prescribed setback distance from a pixel in the first set of pixels is a seed pixel.

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Muir further discloses that the aforesaid subsequently determined pixel is determined based on a grown region including the seed pixel (Muir col. 5 line 65).

Muir further discloses that the pixel from the second set of pixels which lies a prescribed distance from a first set of pixels has a characteristic of being a source image (Muir col. 5 lines 59-60). The image in Muir which is segmented qualifies as a source image as recited in the claim.

9. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Olsson in view of Bruce (USPN 6,678,064). The arguments as to the relevance of Olsson as applied to claim 1 above are incorporated herein.

With regard to claim 21, Olsson discloses a control program which executes the steps of a method, but fails to expressly disclose a carrier wave encoded to transmit this control program. Bruce, however, teach that program code may be transmitted via a carrier wave (Bruce col. 8 lines 3-10). It would have been obvious to one reasonably skilled in the art at the time of the invention to modify the Olsson's control program by adding a carrier wave encode to transmit it as taught by Bruce. Such a modification would have allowed for a way of transmitting the control program (Bruce col. 8 line 4).

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick L Edwards whose telephone number is (703) 305-6301. The examiner can normally be reached on 8:30am - 5:00pm M-F.

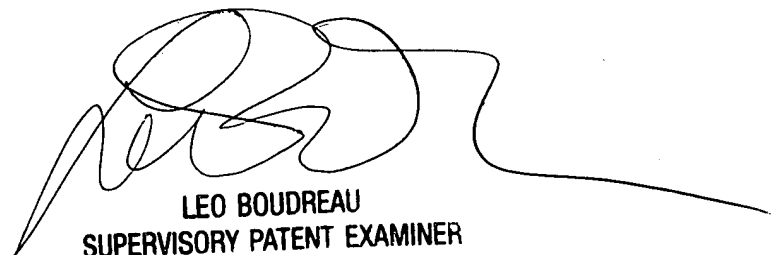
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Patrick L Edwards

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